ACTA UNIVERSITATIS AGRICULTURAE ET SILVICULTURAE MENDELIANAE BRUNENSIS

Volume 65 133 Number 4, 2017
https://doi.org/10.11118/actaun201765041279

EPIGEIC SPIDERS FROM LOWLAND OAK WOODLANDS IN THE SOUTH MORAVIA REGION (CZECH REPUBLIC)

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Abstract

SUROVCOVÁ KAMILA, KOŠULIČ ONDŘEJ, HULA VLADIMÍR. 2017. Epigeic Spiders from Lowland Oak Woodlands in the South Moravia Region (Czech Republic). *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis,* 65(4): 1279–1294.

This paper presents spider faunistics from abandoned coppice oak forest stands located along the South Moravia region. Spiders were collected from May to July 2012 by pitfall trapping at eight different localities. We collected 1945 adult spiders representing 20 families, 53 genera, and 90 species. More than one-third of all the species are known to be xerothermophilous with ecological restrictions to open and partly shaded habitats such as forest-steppe and sparse forests which belong to endangered habitats along central Europe. The most abundant species were *Pardosa alacris, P. lugubris* and *Arctosa lutetiana* from the family Lycosidae. In the surveyed area, 24 species were found listed in the Red List of Threatened Species in the Czech Republic (CR – 1 species, EN – 2 species, VU – 15 species, LC – 6 species). In general, we discovered a substantially diversified spider community with a large presence of rare and endangered species characteristic for open and xeric habitats.

Keywords: araneae, biodiversity, faunistics, coppice forests, woodlands

INTRODUCTION

Spiders are a group of animals widely used for bioindication in studies assessing impact of agricultural, forestry or conservation interventions on the quality of ecosystems (Marc *et al.*, 1999; Košulič *et al.*, 2016). They are used due to their species and ecological diversity in various terrestrial habitats (Wise, 1993; Cardoso *et al.*, 2011). For biomonitoring research, spiders occurring on the soil surface (so called epigeic spiders) are widely used. They are well studied and they are easily monitorable using simple techniques such as pitfall trapping (Růžička, 1987). Another reason for their use for bioindicative research is their position in the trophic chain – they are predators without a food specialization in most cases (Wise, 1993). Many species of epigeic spiders are common over a wide area, but remain closely associated with their environment and are relatively easily monitorable by pitfall traps and individual collecting methods (Wise, 1993; Pearce and Venier, 2006). Because of these attributes, they constitute a good indicator group among organisms that may be surveyed to help in the assessment of the natural situation and changes occurring in the locations (Buchar, 1983; Buchar and Růžička, 2002; Kůrka *et al.*, 2015). From these reasons, they are very suitable group for faunistic and biodiversity studies in various ecosystems.

The research of araneofauna in the Czech Republic is extensively and well studied, however, forest habitats (especially thermophilic oak woodlands) in South Moravia region have not been studied very well in last decades (cf. Buchar and Růžička, 2002; Bryja *et al.*, 2005). On the other hand, other forest ecosystems such as mountain forests and forest habitats at higher altitudes with beech and spruce forest stands have been studied more intensively around Czech Republic (e.g. Buchar and Růžička, 2002; Kůrka, 1997; Kůrka, 1999;

Košulič, 2015). There are only two studies which mentioned faunistic record of spiders from lowland oak woodlands in southern Moravia (Bryja *et al.*, 2005; Spitzer *et al.*, 2008). These authors provided extensive faunistic contribution which mentioned many rare and bioindicatively important species of spiders from lowland oak forest stands. They made first awareness that sparse and formerly coppice oak forests may be important habitats for many xeric species which usually live in steppe habitats.

This research began for the purpose to extend knowledge of spiders occurring in lowland oak forests which were formerly coppiced and used for other extensive management efforts. Previous authors point out that this type of forest habitats may be species rich with presence of various araneocenosis (Bryja *et al.*, 2005; Košulič *et al.*, 2016). Therefore, we suggest that faunistic discoveries in this paper will provide important contribution to the knowledge of araneofauna of lowland oak woodlands and may be also used as practical information for conservation management of mentioned habitats.

MATERIAL AND METHODS

Study area and locations

The research was performed in vicinity of Hodonín, Břeclav and Brno (Fig. 1). This study area is a crossroads between the Hercynian highlands, the Carpathians, and the Pannonian biogeographic region, and it hosts a great biodiversity of thermophilic fauna and flora (Mackovčin, 2007). It encompasses around 650 km^2 in a lowland type of landscape (150–350 m a.s.l.) that consists of a mosaic of intensified arable land, settlements, deciduous forests, orchards, and small patches of open grasslands (Mackovčin, 2007). All study locations in selected area were formerly managed by traditional forest management such as coppice, but at the recent time, they are abandoned or non-intervened. Only in certain areas, occasional disturbances are present as a conservation thinning and selected tree logging.

We selected eight main and largest formerly coppiced forests in the municipalities of Morkůvky, Němčičky, Boleradice, Kurdějov, Vranovice, Milovice, Dubňany, and Mutěnice (Fig. 1, Tab. I). All study locations were afforested with various species of oaks (*Quercus robur, Q. pubescens, Q. petraea,*) and hornbeam (*Carpinus betulus*) as the main tree species. Accompanying tree species included ash (*Fraxinus excelsior*), linden (*Tilia cordata*), and field maple (*Acer campestre*). All study sites had similar altitudes and comparable forest growth ages (former coppiced forests >80 years) and are now not actively managed or disturbed by humans.

Samples collection and methods

We established transects 60 m long reflecting the canopy openness gradient in each of the eight studied forest stands. This transects consisted of five pitfall traps placed at regular intervals (15 m). Each trap location differed in light density from the most open and sparse canopy (forest steppe clearings) to the most closed and dense canopy (dense forest habitat). This transects were selected from that reason that we needed to collected all spider species from different ecological groups (from heliophilous to psychrophilous). Each pitfall trap consisted of a plastic cup (9 cm in diameter, 15 cm long) sunk so as to be flush with the soil surface and filled with 4% formaldehyde solution as a killing and preserving agent. Traps were placed in 1 May 2012 and deactivated at the 20 July 2012. Traps were emptied two times (10 June and 20 July 2012). This sampling period was chosen because most central European spiders reach adulthood during this time of the season and can therefore be determined to species level and used for further evaluations (Roberts, 1995). Individual sites used for collecting spiders were identified by GPS coordinates (Table I). Maps with the occurrence of particular species were created by online application of BioLib (2017) website. Following publications were used for actual distribution data: Buchar and Růžička (2002); Bryja *et al.* (2005); Košulič (2014, 2015); Košulič and Hula (2012, 2013, 2014); Hula and Šťastná (2010); Hula *et al.* (2012, 2014); ČAS (2017) and Macek (2017).

Species identification

All spider material was determined to species level by means of Heimer & Nentwig (1991), Roberts (1995) and Nentwig *et al.* (2017). Nomenclature and arrangement of families, genera and species follow the most recent version of the World Spider Catalog (2017). Occurrence level in the Czech Republic (number and distribution of grid squares, in which the species occur in the Czech Republic; Buchar and Růžička, 2002; Růžička and Buchar, 2008) and conservation status (Řezáč *et al.*, 2015) were used for faunistic evaluation of collected material. Occurrence level was categorized as follow: VA (very abundant), A (abundant), S (scarce), R (rare) and VR (very rare). Conservation status was categorized as follow: CR (critically endangered), EN (endangered), VU (vulnerable), LC (least concern).

All examined material was deposited in the collection of the Mendel University, Faculty of Forestry and Wood Technology in Brno. The numbers of collected species and specimens in each studied locality are shown in Tab. I.

RESULTS AND DISCUSSION

During the arachnological research of selected oak woodland, 1945 adult spiders were collected. They were identified to 90 species, 22 families and 53 genera (Tab. II). The most abundant species were *Pardosa alacris* (C. L. Koch, 1833), *Pardosa lugubris* (Walckenaer, 1802) and *Arctosa lutetiana* (Simon, 1876) which belonged to the family Lycosidae. The dominant representation of *A. lutetiana* is

interesting as this species is relatively rare in the Czech Republic (Buchar and Růžička, 2002). However, according to Dolejš (2014), this species is very typical for sparse and warm oak forest habitats where can reach high abundances. The highest species diversity was found in families Gnaphosidae (19 species), Lycosidae (15 species) and Linyphiidae (11 species) (Tab. III). The most abundant families were Lycosidae (1366 individuals), Gnaphosidae (189 individuals) and Thomisidae (120 individuals).

In comparing of ecological affinity of spider species according to Buchar and Růžička (2002) and Bryja *et al.* (2005), we discovered 31 species which are classified as having a preference for forest habitats and 54 species which are classified as having a preference for open habitats with a higher level of canopy openness. More than one-third of all the species are known to be xerothermophilous with ecological restrictions to open and partly shaded habitats such as forest-steppe and sparse forests (N = 38). The recorded araneocenosis contained a total of 24 species (26%) listed in the Red List of Threatened Species in the Czech Republic (Řezáč *et al.*, 2015). Species from the Red List of Threatened Species include to the categories: critically endangered – *G. modestior*; endangered – *D. pumilus* and *W. monoceros*; vulnerable – *A. piceus, C. schuszteri, D. villicus, M. formicaria, Z. erebeus, S. celans, A. sulzeri, A. lutetiana, P. bifasciata, P. hortensis, Z. manicata, T. arenarius, E. laetabunda, C. blackwalli* and *X. luctator*; least concern – *D. moravica, Z. apricorum, Z. aurantiacus, Z. electus, A. cuprea* and *E. truncatus*. We found many spider species typical for forest steppe and steppe habitats which are categorized in very rare to scarce categories of occurrence level in the Czech Republic (Buchar and Růžička, 2002; Růžička and Buchar, 2008), namely: very rare: *G. modestior*; rare: *A. sulzeri*, *A. lutetiana*, *C. schuszteri*, *C. blackwalli*, *D. pumilus*, *D. villicus*, *D. moravica, E. truncates*, *M. formicaria*, *S. celans*, *T. arenarius*, *W. monoceros*, *Z. manicata*; scarce: *A. cuprea*, *A. proxima*, *A. trabalis*, *A. piceus*, *A. albimana*, *C. prominens*, *E. laetabunda*, *H. nava*, *O. praticola*, *P. alacris*, *P. bifasciata*, *P. hortensis*, *T. campestris*, *T. pedestris*, *W. furcillata*, *X. miniata*, *X. lanio*, *X. luctator*, *Z. apricorum*, *Z. aurantiacus*, *Z. electus*, *Z.erebeus* and *Z. germanicum*.

Most of these thermophilous species are strictly depended to the xeric and semixeric habitats with low vegetation structure and open canopy and presence of barren surfaces (Bryja *et al.*, 2005; Košulič and Hula, 2014). Košulič *et al.* (2016) point out that the main driver of spider distribution in oak woodlands is canopy opening. Respectively, open habitats in forests with a lot of canopy gaps are very important for forest biodiversity. Unfortunately, such habitats are diminishing in the constantly intensified landscape of southern Moravia due to overgrowing of such suitable places and intensified agriculture and forestry (Spitzer *et al.*, 2008; Šebek *et al.*, 2015).

All significant species of spiders found in this study are described below.

Annoted list of significant species

Nomenclature is according World Spider Catalogue (2017), Red List Category according Řezáč *et al.* (2015).

Atypidae

Atypus piceus (Sulzer, 1776)
This species occurs on warm hillsides, sunny edges of forests, arid pasture land and forest steppes (Řezáč *et al.*, 2015). All species of *Atypus* genus make typical burrows with a dense web, which protrudes above the surface as a purse-web about 10 cm long (Bristowe, 1958). The horizontal position of purse-webs, characteristic of European species, is considered to be an adaptation for capturing prey under snow cover (Schwendinger, 1989). It is difficult to find *Atypus* purse-web as the spiders camouflage their outer surface with soil particles (Řezáč *et al.*, 2007). Vulnerable species.
Location: Morkůvky, Němčičky, Vranovice, Mutěnice, Dubňany and Milovice (Fig. 2).

Dysderidae

Dysdera moravica Řezáč, 2014
This species was previously named as *D. ninnii* Canestrini 1868, but taxonomic revision showed, however, that it is in fact a complex of several species (Řezáč *et al.*, 2014). Now, it was described as a separate species *D. moravica* belonging to the Pannonian region (Řezáč *et al.*, 2014). This is a thermophilic species whose occurrence in the Czech Republic represents the most northern location in the whole Europe. In the Czech Republic, it lives only in 21 locations in xeric habitats such as southern slopes in the lowland oak forests, vineyard terraces, forest steppes etc. (Řezáč, 2012). Nearly threatened species.
Location: Dubňany (Fig. 3).

Gnaphosidae

Callilepis schuszteri (Herman, 1879)
A rare Palaearctic species of Czech araneofauna. This species is bounded to the steppes, xeric edges of forests and scree slopes (Buchar and Růžička, 2002; Bryja *et al.*, 2005). This species belong to the food specialists, which prey predominantly ants (Kůrka *et al.*, 2015).
Vulnerable species.
Location: Morkůvky, Němčičky, Mutěnice and Milovice (Fig. 4).
Drassyllus villicus (Thorell, 1875)
A European species, rare in the Czech Republic (Kůrka *et al.*, 2015). Species characteristic for rock and forest steppes or sun-exposed scree slopes (Hula and Šťastná, 2010), where it often hides under rocks (Buchar and Růžička, 2002). Vulnerable species.
Location: Milovice, Mutěnice, Němčičky and Morkůvky (Fig. 5).
Gnaphosa modestior Kulczyński, 1897
A species with uncertain taxonomy. If we follow present literature (Kůrka *et al.*, 2015) all record of this morphotype belongs to *G. modestior*. But it is

in contrary of global revision of genus *Gnaphosa* (Ovtsharenko *et al.*, 1992). It is highly probable that it is species complex and taxonomical revision is needed. *Gnaphosa modestior* is distributed in eastern Europe to Azerbaijan (Platnick, 1997). According to arachnological research, this species prefers bright ecotones between xerotherm herbal-grass habitats and dry oak and hornbeams (Gajdoš and Majzlan, 2001). In the Czech Republic, it has very rare distribution in South Moravia (Košulič and Hula, 2012). Critically endangered.
Location: Dubňany, Milovice and Mutěnice (Fig. 6).
Micaria formicaria (Sundevall, 1831)
A rare and endangered Palearctic species that is bounded to the steppes, xeric forest edges, where lives under rocks and grass (Buchar and Růžička, 2002). In the Czech Republic, it occurs rarely throughout in the lower elevations (Niedobová *et al.*, 2011). This species overwinter often in shells of land-snails (Hula *et al.*, 2009). Vulnerable species.
Location: Morkůvky, Němčičky, Milovice and Vranovice (Fig. 7).
Zelotes aurantiacus Miller, 1967
A thermophilic species in the lowlands where it lives on rocky steppes, light forests, dry slopes, dry-lit forest edges; under stones and grass (Kůrka *et al.*, 2015). This species often inhabit steppes in oak and pine forests in southern Moravia (Bryja *et al.*, 2005). Nearly threatened species.
Location: Dubňany (Fig. 8).

Linyphiidae

Walckenaeria monoceros (Wider, 1834)
A rare Palaearctic species inhabiting xeric habitats, e.g. rocky steppe or forest steppe, where it prefer places with denser canopy (Buchar and Růžička, 2002). This spider often occurs in detritus on the rocky steppes (Kůrka *et al.*, 2015). In the Czech Republic, it is recorded in the warmest places of Bohemia (Křivoklátsko, Český kras, Dolní Povltaví, Kokořínsko) (Kůrka *et al.*, 2015). Categorized as an endangered species.
Location: Kurdějov, Němčičky (Fig. 9).

Liocranidae

Scotina celans (Blackwall, 1841)
A species occurring from lowlands to middle altitude on the sunlit slopes of scree and detritus in dry forests between rocks, under stones and bark of trees (Buchar and Růžička, 2002). Common species of light forests of Pálava PLA (Bryja *et al.*, 2005). Vulnerable species.
Location: Němčičky (Fig. 10).
Lycosidae
Alopecosa sulzeri (Pavesi, 1873)
This species is bounded to steppe habitats, it is also dominant species on calcareous habitats and open sandy pasture lands (Szinetár *et al.*, 2005). This is a rare thermophilic species occurring from lowlands to middle altitudes (Kůrka *et al.*, 2015). Adult individuals appear from April to July (Machač, 2008). Vulnerable species.
Location: Mutěnice, Němčičky and Milovice (Fig. 11).
Arctosa lutetiana (Simon, 1876)
A rare species inhabiting rocky steppe, forest steppe, sandbanks, warm bushy slopes and sunlit forest edges of lower altitudes. At Moravia region, this species is more common only on sand soils (Hula *et al.*, 2014). This wolf spider was the most abundant species at study locations. Vulnerable species.
Location: Dubňany, Mutěnice (Fig. 12).
Pardosa bifasciata (C. L. Koch, 1834)
A locally common species of different sand areas where is sometimes very common (Hula *et al.*, 2014). Characterised as a vulnerable species.
Location: Morkůvky, Mutěnice, Dubňany, Němčičky (Fig. 13).
Pardosa hortensis (Thorell, 1872)
Scarce species of epigeic spider preffering sunny and warm habitats such as steppe and forest-steppe. Good bioindicator of well preserved open habitats (Hula and Šťastná, 2010).
Location: Mutěnice (Fig. 14).

Miturgidae

Zora manicata Simon, 1878
This species inhabits rocky steppes and forest steppes. In the Czech Republic, it is recorded only in warm regions from Bohemia (Kůrka *et al.*, 2010) and southern Moravia (Bryja *et al.*, 2005). Vulnerable species.
Location: Mutěnice (Fig. 15).

Philodromidae

Thanatus arenarius Thorell, 1872
A rare Palearctic species which is recorded only in warmer areas of Central Bohemia and South Moravia (Bryja *et al.*, 2005). It inhabits sandy areas, rocky steppes and heath (Buchar and Růžička, 2002). Locally common on loess and sandy soils (Košulič and Hula, 2014; Hula *et al.*, 2014). Vulnerable species.
Location: Mutěnice, Dubňany (Fig. 16).

Salticidae

Evarcha laetabunda (C. L. Koch, 1846)
A locally common species of different xeric habitats, but known also from peatbogs. In Moravia, recorded from different places, but mainly from the Moravian Karst PLA (Niedobová *et al.*, 2011). Vulnerable species.
Location: Milovice (Fig. 17).

Thomisidae

Cozyptila blackwalli (Simon, 1875)
A rare species known from the scree forests under stones (Buchar and Růžička, 2002). European species extending to western Siberia. Vulnerable species.
Location: Vranovice (Fig. 18).

I: *Characteristics of study sites located across South Moravia in the Czech Republic with number of species and specimens.*

Location	District	Coordinates	Altitude (m a. s. l.)	Species number	Specimen number	Faunistic square
Morkůvky	Břeclav	48°57′12″N 16°50′11″E	280	36	287	7067
Němčičky	Břeclav	48°56′35″N 16°50′19″E	245	42	289	7076
Kurdějov	Břeclav	48°58′58″N 16°46′41″E	298	26	91	7066
Boleradice	Břeclav	48°56′43″N 16°50′55″E	315	29	225	7067
Milovice	Břeclav	48°50′55″N 16°41′34″E	225	32	256	7166
Vranovice	Brno	48°57′25N, 16°35′46″E	202	30	184	7065
Mutěnice	Hodonín	48°52′51″N 17°42′49″E	180	40	289	7068
Dubňany	Hodonín	48°53′30″N 17°7′10″E	204	31	324	7168

II: *List of recorded species with ecological indicators, in alphabetical order and the total numbers of specimens of spiders at individual collecting sites.*

Species	Conservation status	Degree of Rareness	Study locations							
			Morkůvky	Němčičky	Kurdějov	Boleradice	Milovice	Vranovice	Mutěnice	Dubňany
Agelenidae										
Agelena labyrinthica (Clerck, 1757)		A	1		1					
Coelotes terrestris (Wider, 1834)		VA		3	1	2		2		
Histopona torpida (C. L. Koch, 1834)		VA	2	17	1	4	5	3		1
Tegenaria campestris (C. L. Koch, 1834)		S		2				2		
Araneidae										
Cercidia prominens (Westring, 1851)		S							1	
Atypidae										
Atypus piceus (Sulzer, 1776)	VU	S	4	7			2	3	7	7
Clubionidae										
Clubiona pallidula (Clerck, 1757)		A						1		
Clubiona terrestris Westring, 1851		A						2		2
Dictynidae										
Cicurina cicur (Fabricius, 1793)		A		1			2			
Dysderidae										
Dysdera moravica Řezáč, 2014	LC	R								1
Harpactea lepida (C. L. Koch, 1838)		VA	3			2				
Harpactea rubicunda (C. L. Koch, 1838)		VA	4		1	2	5	1		2
Gnaphosidae										
Callilepis schuszteri (Herman, 1879)	VU	R	2	5			41		1	
Drassodes lapidosus (Walckenaer, 1802)		VA		2				2		3
Drassodes pubescens (Thorell, 1856)		VA		1			2			

Species	Conservation status	Degree of Rareness	Study locations							
			Morkůvky	Němčičky	Kurdějov	Boleradice	Milovice	Vranovice	Mutěnice	Dubňany
Drassyllus praeficus (L. Koch, 1866)		A	2	4	1	3	5			
Drassyllus pumilus (C. L. Koch, 1839)	EN	R	2	2			1		2	
Drassyllus pussilus (C. L. Koch, 1833)		A		2		2	3			
Drassyllus villicus (Thorell, 1875)	VU	R	4	6			7		2	
Gnaphosa modestior Kulczyński, 1897	CR	VR					2		5	5
Haplodrassus signifer (C. L. Koch, 1839)		VA	1	6	2	2	6	1	4	
Haplodrassus silvestris (Blackwall, 1833)		A	3				3	2	2	
Micaria formicaria (Sundevall, 1831)	VU	R	2	3			1	1		
Micaria pulicaria (Sundevall, 1831)		VA		2				1		
Trachyzelotes pedestris (C. L. Koch, 1837)		S						7	1	
Zelotes apricorum (L. Koch, 1876)	LC	S		1	2			3	1	
Zelotes aurantiacus Miller, 1967	LC	S								2
Zelotes electus (C. L. Koch, 1839)	LC	S	2						2	
Zelotes erebeus (Thorell, 1871)	VU	S	1	2					2	
Zelotes petrensis (C. L. Koch, 1839)		A						2		
Zelotes subterraneus (C. L. Koch, 1833)		VA				1			2	
Hahniidae										
Hahnia nava (Blackwall, 1841)		S		1		1				
Linyphiidae										
Centromerus sylvaticus (Blackwall, 1841)		VA		2						3
Erigone dentipalpis (Wider, 1834)		VA						1		
Linyphia hortensis (Sundevall, 1830)		A			4			1		
Linyphia triangularis (Clerck, 1757)		VA				2		2		
Micrargus herbigradus (Blackwall, 1854)		VA		2					1	
Neriene clathrata Sundevall, 1830		VA		1					1	
Neriene montana (Clerck, 1757)		A				1				
Tenuiphantes flavipes (Blackwall, 1854)		VA	1					2	1	1
Walckenaeria atrotibialis O. P.-Cambridge, 1878		VA							1	
Walckenaeria furcillata (Menge, 1869)		S		1						2
Walckenaeria monoceros (Wider, 1834)	EN	R		1	1					
Liocranidae										
Agroeca brunnea (Blackwall, 1833)		VA			2	3	1		4	
Agroeca cuprea Menge, 1873	LC	S	1			2	4			1
Agroeca proxima (O. P.-Cambridge, 1871)		S	1							1
Scotina celans (Blackwall, 1841)	VU	R		1						
Lycosidae										
Alopecosa accentuata (Latreille, 1817).		A	4	1			2			
Alopecosa cuneata (Clerck, 1757)		VA	4		1		1	2	3	2
Alopecosa pulverulenta (Clerck, 1757)		VA			2					
Alopecosa sulzeri (Pavesi, 1873)	VU	R		4			2		5	
Alopecosa trabalis (Clerck, 1757)		S	1	1					7	3
Arctosa lutetiana (Simon, 1876)	VU	R							42	25
Aulonia albimana (Walckenaer, 1805)		S		2					2	
Pardosa alacris (C. L. Koch, 1833)		S	111	65	28	104	63	72	75	114

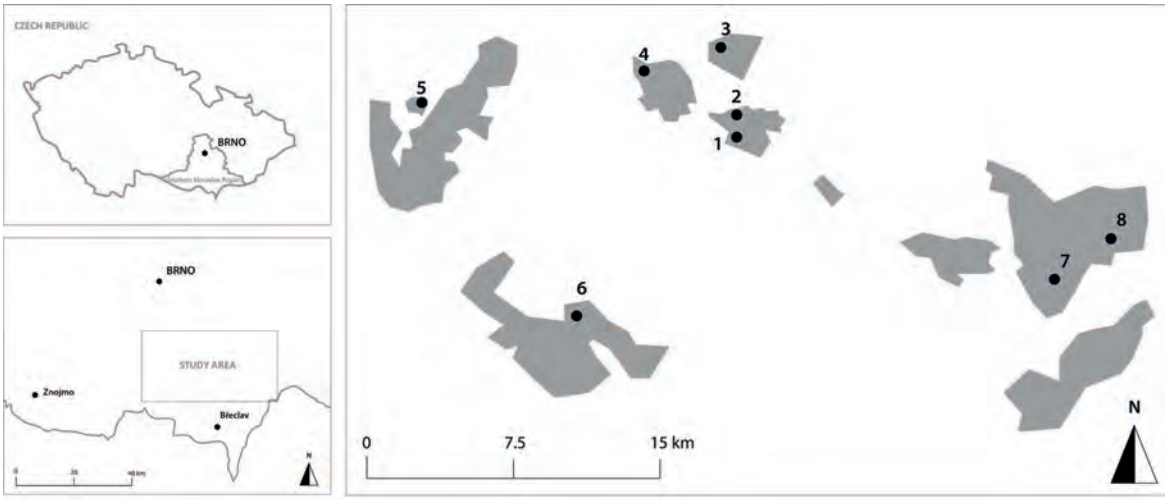
Species	Conservation status	Degree of Rareness	Study locations							
			Morkůvky	Němčičky	Kurdějov	Boleradice	Milovice	Vranovice	Mutěnice	Dubňany
Pardosa bifasciata (C. L. Koch, 1834)	VU	S	1	2					5	2
Pardosa hortensis (Thorell, 1872)		S							1	
Pardosa lugubris (Walckenaer, 1802)		VA	72	102	31	65	53	57	59	85
Pardosa riparia (C. L. Koch, 1833)		A		1		1	3			2
Trochosa terricola Thorell, 1856		VA	10	11	4	4	12	3	9	15
Xerolycosa miniata (C. L. Koch, 1834)		S	1		1	2				
Xerolycosa nemoralis (Westring, 1861)		VA	1	6		6	6		3	15
Mimetidae										
Ero furcata (Villers, 1789)		VA							1	3
Miturgidae										
Zora manicata Simon, 1878	VU	R							2	
Zora nemoralis (Blackwall, 1861)		A	5							5
Zora silvestris Kulczyński, 1897		A		1		1			3	
Zora spinimana (Sundevall, 1833)		VA	1	8	2	1	3	1		1
Philodromidae										
Thanatus arenarius Thorell, 1872	VU	R							2	1
Phrurolithidae										
Phrurolithus festivus (C. L. Koch, 1835)		VA		2		2	6	2		
Pisauridae										
Pisaura mirabilis (Clerck, 1757)		VA	2	1			2	2		2
Salticidae										
Euophrys frontalis (Walckenaer, 1802)		A								
Evarcha arcuata (Clerck, 1757)		A			1					
Evarcha laetabunda (C. L. Koch, 1846)	VU	S					1			
Phlegra fasciata (Hahn, 1826)		A				1				
Pseudeuophrys erratica (Walckenaer, 1826)		A				1				
Sparassidae										
Micrommata virescens (Clerck, 1757)		VA		1		1				
Tetragnathidae										
Pachygnatha listeri Sundevall, 1830		A	1						7	7
Theridiidae										
Asagena phalerata (Panzer, 1801)		A	3			3	2			1
Episinus truncatus Latreille, 1809	LC	R	1							
Euryopis flavomaculata (C. L. Koch, 1836)		A	1			5	4			
Robertus arundineti (O. P.-Cambridge, 1871)		VA	4		1					
Robertus lividus (Blackwall, 1836)		VA						1		
Thomisidae										
Cozyptila blackwalli (Simon, 1875)	VU	R						1		
Ozyptila praticola (C. L. Koch, 1837)		S			1				5	
Xysticus cristatus (Clerck, 1757)		VA							1	
Xysticus erraticus (Blackwall, 1834)		A			1				2	
Xysticus kochi Thorell, 1872		A							1	
Xysticus lanio C. L. Koch, 1835		S				1	3			2
Xysticus luctator L. Koch, 1870	VU	S	26	2	1			3	7	8

Species	Conservation status	Degree of Rareness	Study locations							
			Morkůvky	Němčičky	Kurdějov	Boleradice	Milovice	Vranovice	Mutěnice	Dubňany
Zodariidae										
Zodarion germanicum (C. L. Koch, 1837)		S	2	4	1		3	1	7	
Total number of species			36	41	23	28	32	30	40	31
Total abundance			287	289	91	225	256	184	289	324

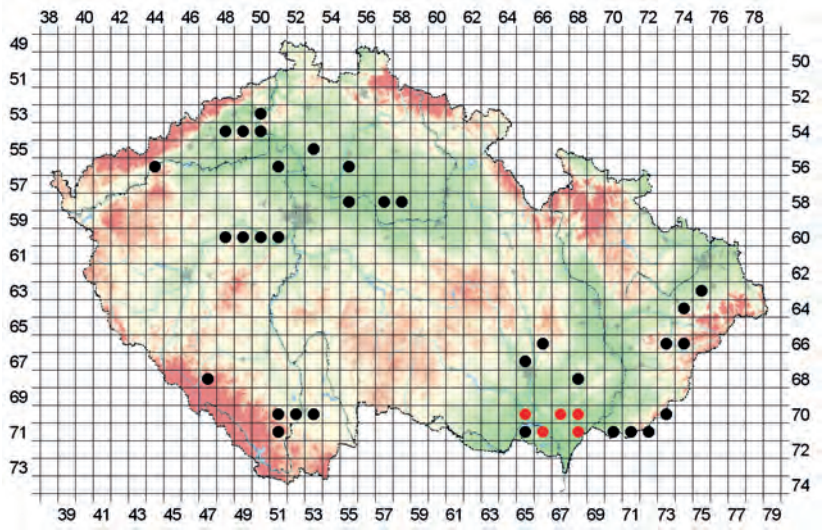
Explanations: Degree of Rareness (based on Buchar and Růžička, 2002): VA (very abundant), A (abundant), S (scarce), R (rare), VR (very rare); Conservation status (according to Řezáč et al., 2015): CR (critically endangered), EN (endangered), LC (least koncern), VU (vulnerable).

III: *Family count with recorded species*

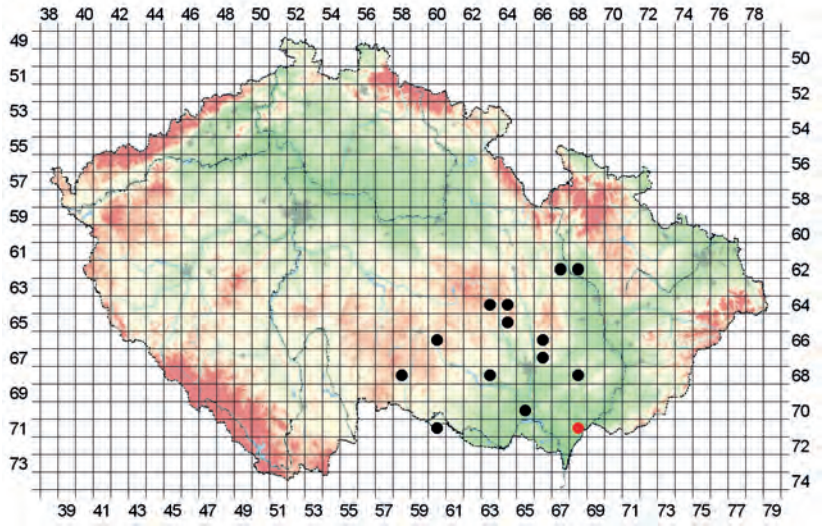
	Family	Species number
1.	**Agelenidae**	4
2.	**Araneidae**	1
3.	**Atypidae**	1
4.	**Clubionidae**	2
5.	**Dictynidae**	1
6.	**Dysderidae**	3
7.	**Gnaphosidae**	19
8.	**Hahniidae**	1
9.	**Linyphiidae**	11
10.	**Liocranidae**	4
12.	**Lycosidae**	15
13.	**Mimetidae**	1
14.	**Miturgidae**	4
15.	**Philodromidae**	1
17.	**Phrurolithidae**	1
18.	**Pisauridae**	1
19.	**Salticidae**	5
20.	**Sparassidae**	1
21.	**Tetragnathidae**	1
22.	**Theridiidae**	5
23.	**Thomisidae**	7
24.	**Zodariidae**	1
	SUM	**90**



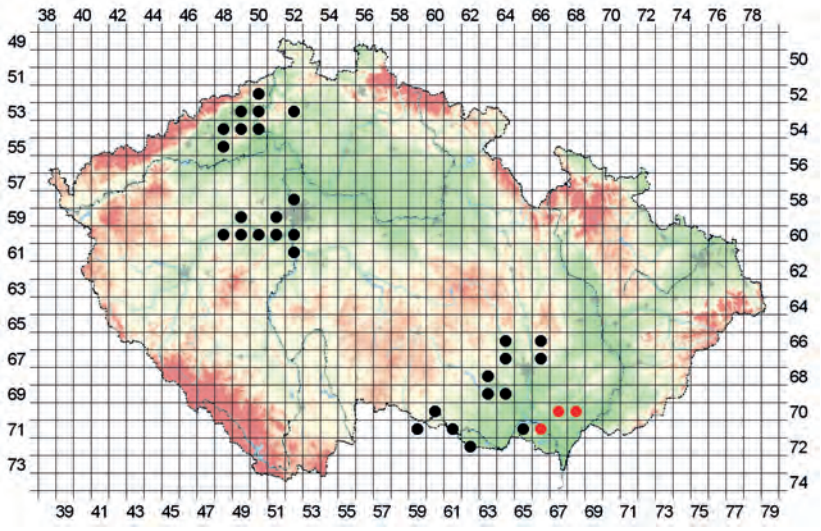
1: *Map of the study area in the southern Moravia in the Czech Republic with a local map localization of study site (grey area – forest complex)*
1 – Němčičky, 2 – Morkůvky, 3 – Boleradice, 4 – Kurdějov, 5 – Vranovice, 6 – Milovice, 8 – Dubňany, 7 – Mutěnice



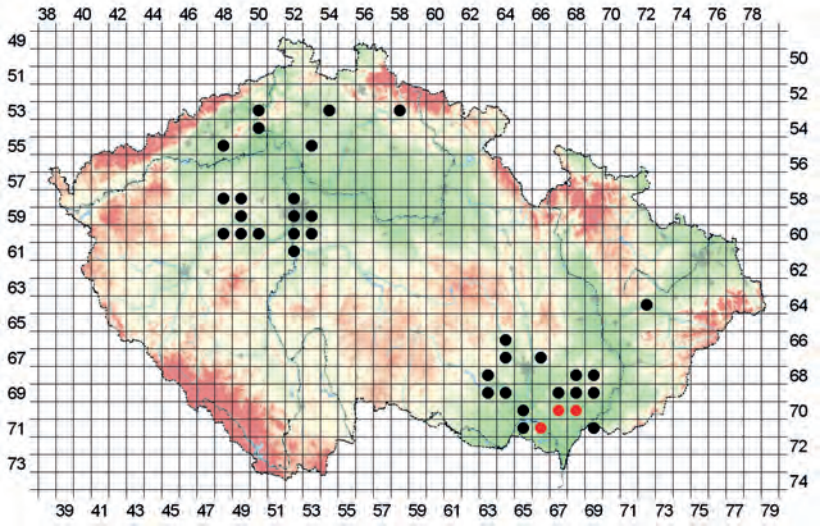
2: *Distribution of Atypus piceus (Sulzer, 1776) in the Czech Republic (red dots – studied locality).*



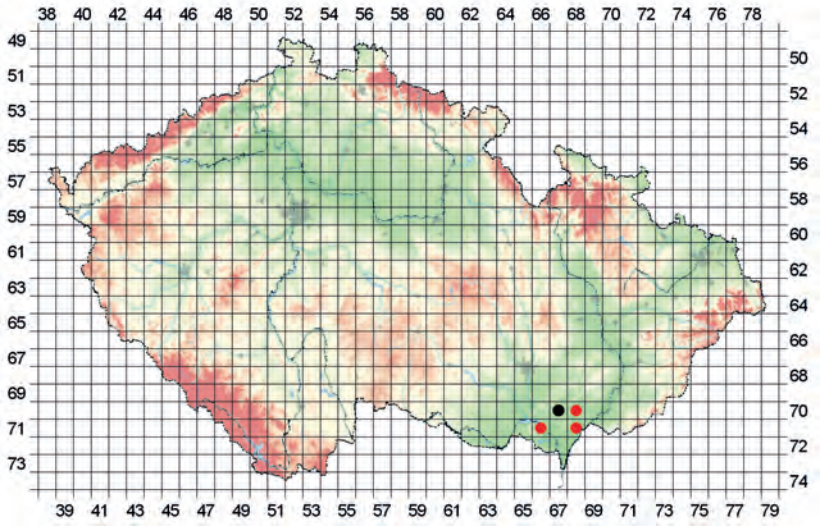
3: *Distribution of Dysdera moravica Řezáč, 2014 in the Czech Republic (red dots – studied locality).*



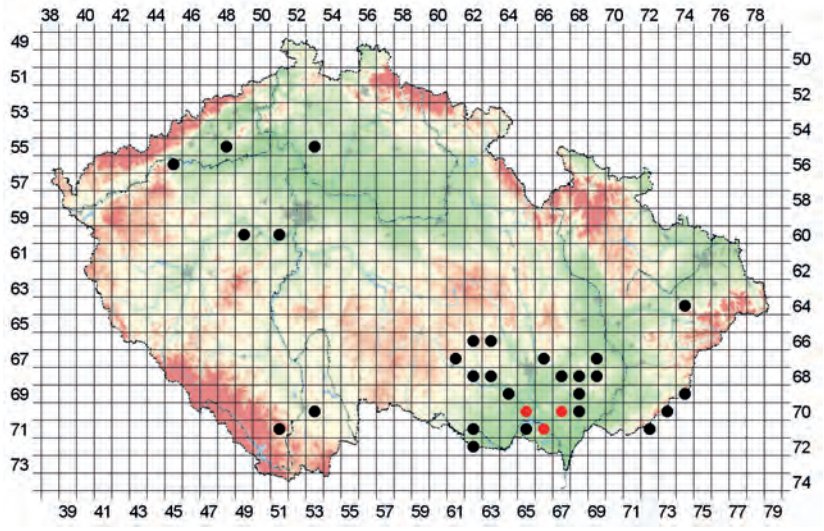
4: *Distribution of Callilepis schuszteri (Herman, 1879) in the Czech Republic (red dots – studied locality).*



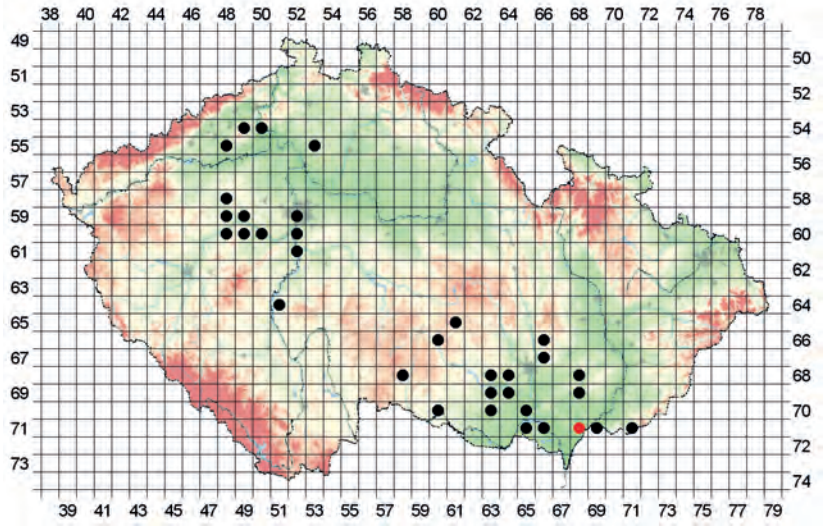
5: *Distribution of Drassyllus villicus (Thorell, 1875) in the Czech Republic (red dots – studied locality).*



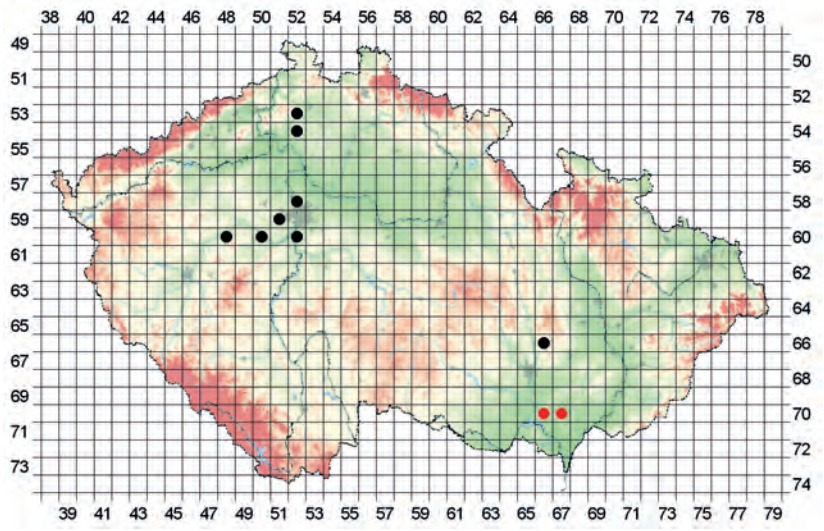
6: *Distribution of Gnaphosa modestior Kulczyński, 1897 in the Czech Republic (red dots – studied locality).*



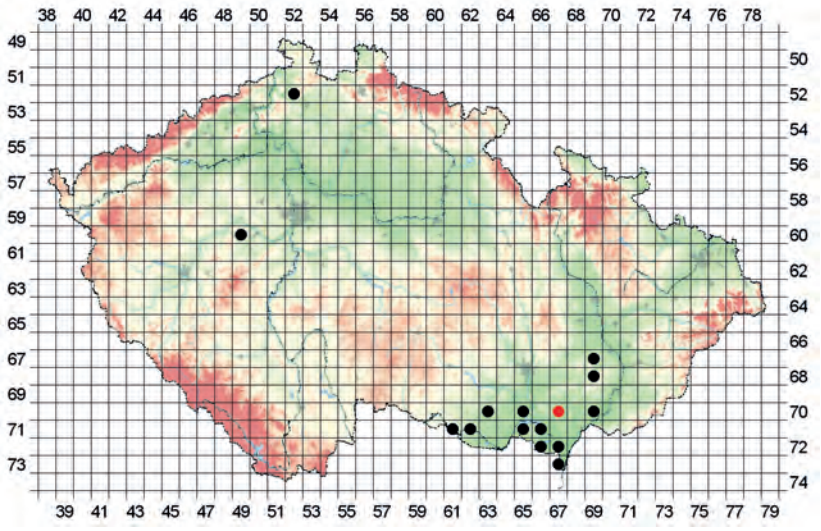
7: *Distribution of Micaria formicaria (Sundevall, 1831) in the Czech Republic (red dots – studied locality).*



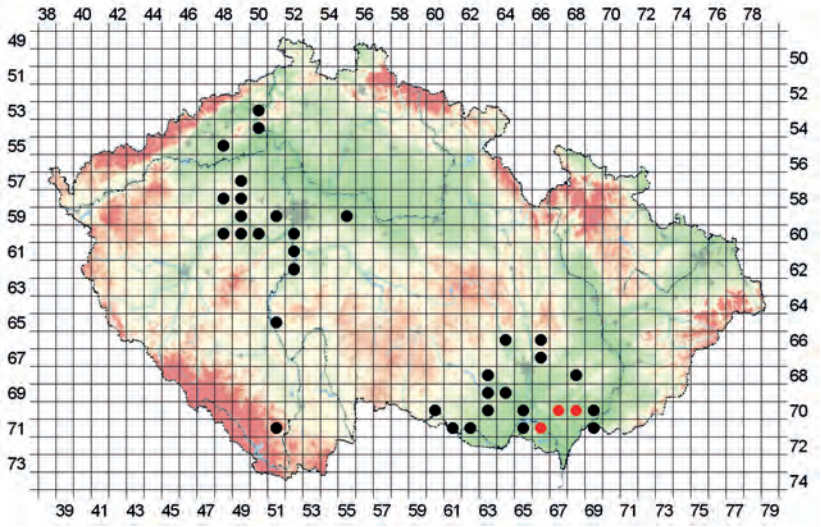
8: *Distribution of Zelotes aurantiacus Miller, 1967 in the Czech Republic (red dots – studied locality).*



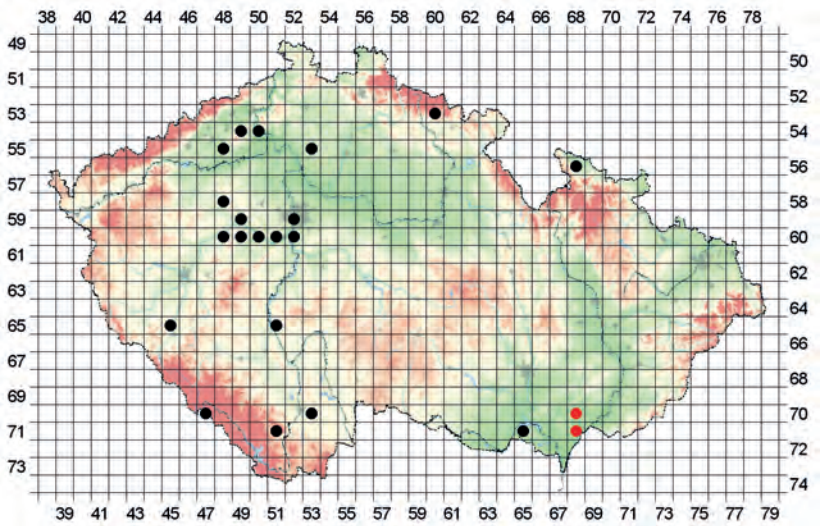
9: *Distribution of Walckenaeria monoceros (Wider, 1834) in the Czech Republic (red dots – studied locality).*



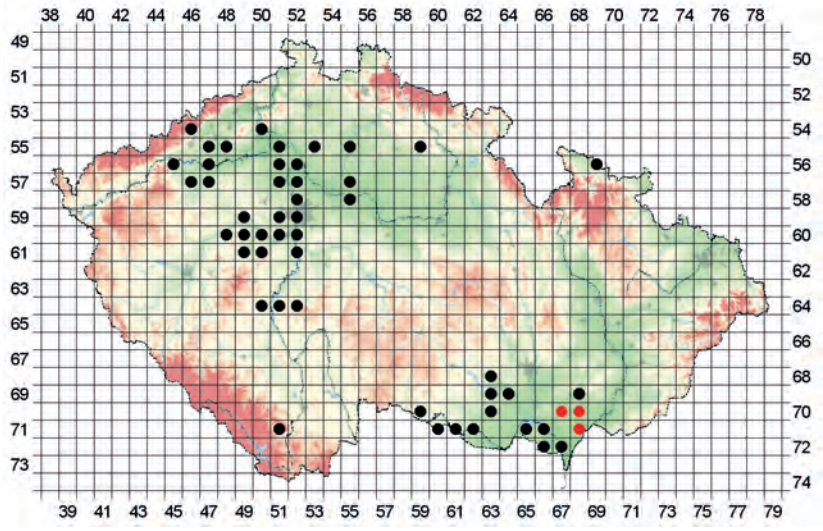
10: *Distribution of Scotina celans (Blackwall, 1841) in the Czech Republic (red dots – studied locality).*



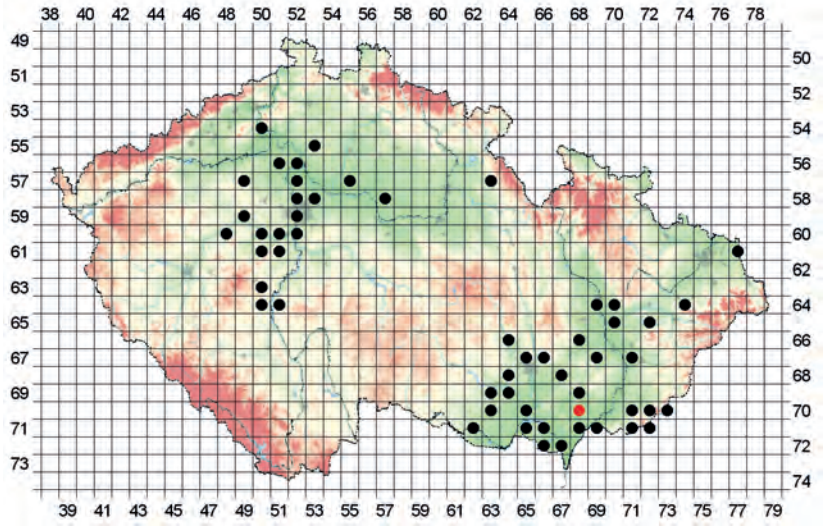
11: *Distribution of Alopecosa sulzeri (Pavesi, 1873) in the Czech Republic (red dots – studied locality.*



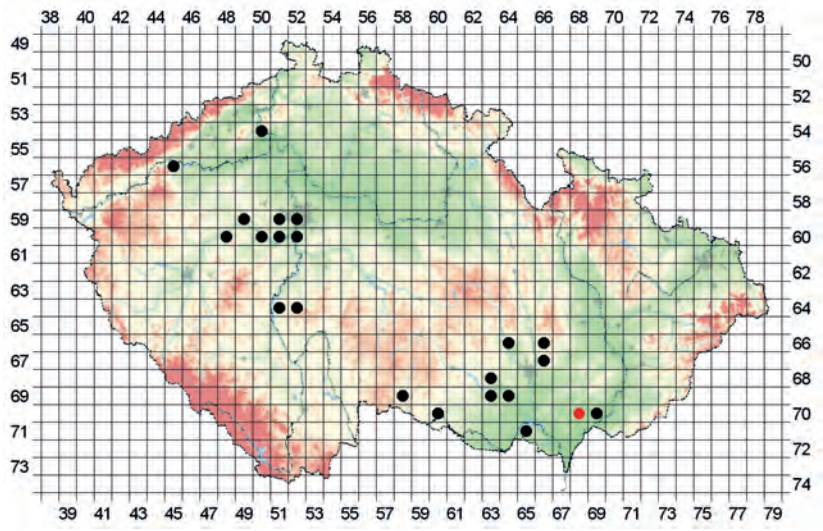
12: *Distribution of Arctosa lutetiana (Simon, 1876) in the Czech Republic (red dots – studied locality).*



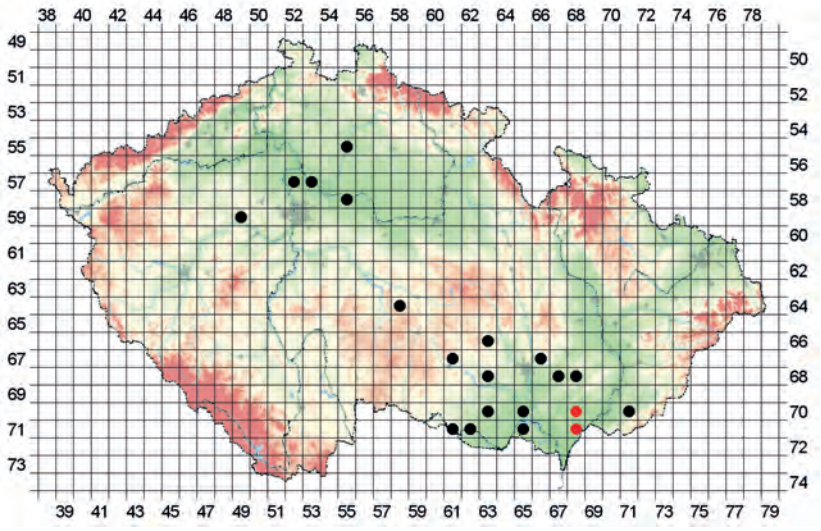
13: *Distribution of Pardosa bifasciata (C. L. Koch, 1834) in the Czech Republic (red dots – studied locality).*



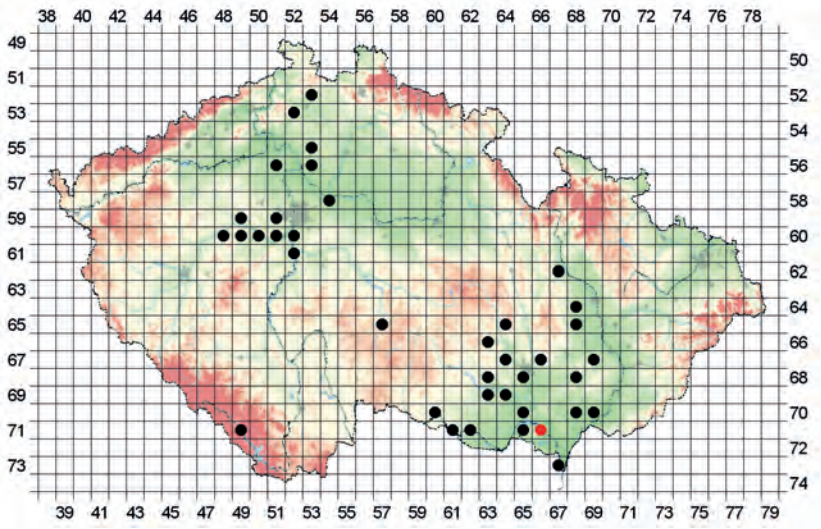
14: *Distribution of Pardosa hortensis (Thorell, 1872) in the Czech Republic (red dots – studied locality).*



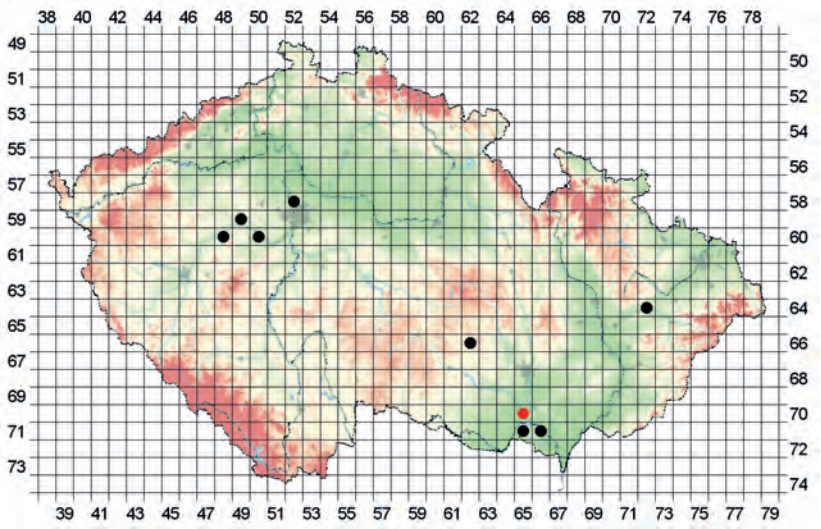
15: *Distribution of Zora manicata Simon, 1878 in the Czech Republic (red dots – studied locality).*



16: *Distribution of Thanatus arenarius Thorell, 1872 in the Czech Republic (red dots – studied locality).*



17: *Distribution of Evarcha laetabunda (C. L. Koch, 1846) in the Czech Republic (red dots – studied locality).*



18: *Distribution of Cozyptila blackwalli (Simon, 1875) in the Czech Republic (red dots – studied locality).*

CONCLUSION

During arachnological research of eight selected lowland oak woodlands, 1 945 adult spiders were collected, belonging to 22 families, 53 genera and 90 species. The most abundant species were representatives of the family Lycosidae – *Arctosa lutetiana, Pardosa alacris* and *P. lugubris*. A total of 31 species have the strong affinity to forest habitats, while 54 species preferring sunny xeric habitats. Of the entire araneocenosis, 23% species belonged to the Red List of Endangered Species of the Czech Republic and 40% of species belonged to the regionally significant xerothermic spiders. Among these rare and endangered species, e.g. *Alopecosa sulzeri, Atypus piceus, Callilespis schuzsteri, Drassyllus pumilus, Drassyllus villicus, Gnaphosa modestior, Thanatus arenarius, Walckenaeria monoceros* and *Zora manicata* were included. To conclude, we discovered a substantially diversified spider assemblage with a large occurrence of rare and thermohilous species of spider's typical for open and xeric habitats. Our results confirm high biotic value of open and sparse oak woodlands in intensified agriculture land of southern Moravia. In this contribution, we also improve our knowledge of faunistic distribution of spiders typical for oak woodlands located in the Czech Republic, which were not well studied in previous researches.

Acknowledgment

Authors would like to thank to Petr Dolejš (National Museum in Prague) for his comments that significantly improved our manuscript. The research was performed and financially supported within the Specific University Research Fund of the FFWT Mendel University in Brno [Reg. Numbers: LDF_PSV_2017004, LDF_PSV_2016004 and LDF_VP_2017023].

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